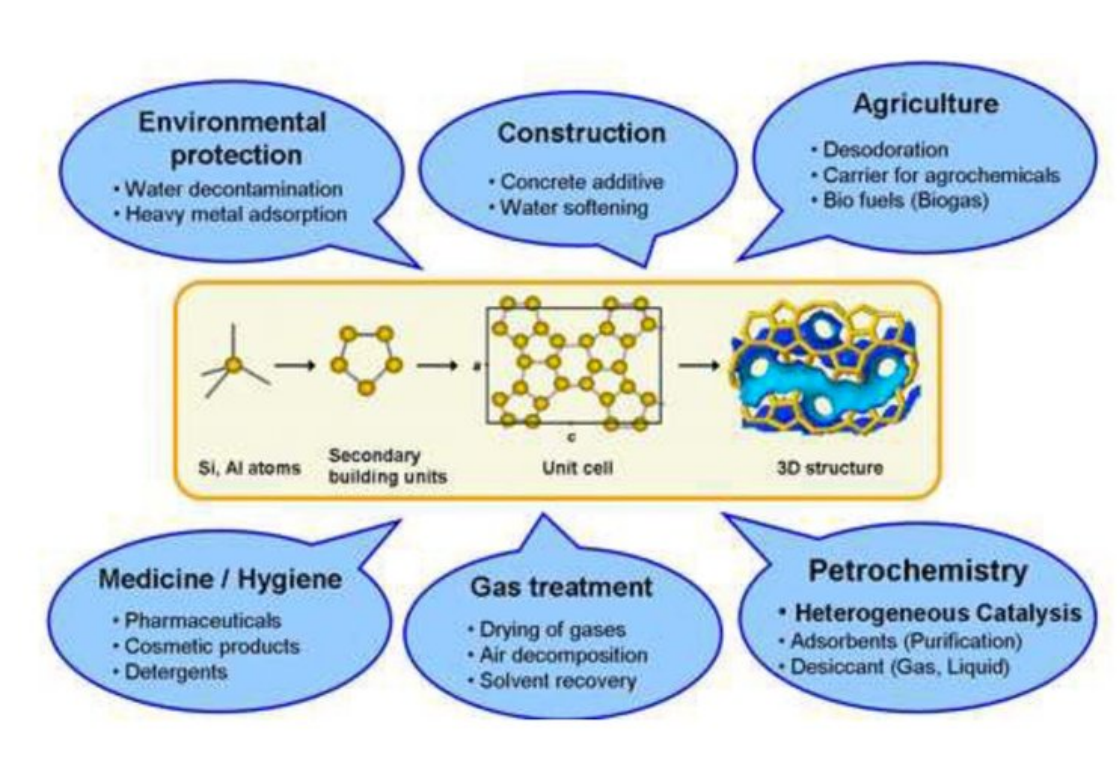
The 19+ Benefits Of Zeolite And Clinoptilolites

Zeolite: A Powerful Chelation And Redox Tool



Zeolites are very promising for improving environment protection, detoxication, human nutrition status and immunity, separation of various biomolecules and cells, construction of biosensors and detection of biomarkers of various diseases, proper drug/gene delivery, antioxidant regulation, and tissue engineering. R

In this post, we will discuss where zeolites come from, its benefits/downsides, and where to get zeolite.

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1. Basics Of Zeolite
2. Benefits Of Zeolite
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Basics Of Zeolite

Zeolite is a collective name for minerals and chemical compounds within the group of silicates, with some prominent ones: **Clinoptilolite** (aluminum), **Sepiolite** (magnesium) **Analcime**, **Chabazite**, **Heulandite**, **Natrolite**, **Phillipsite**, and **Stilbite**. R R

Zeolites are microporous materials (natural and synthetic) that are used for a variety of applications: catalysts and as molecular sieves, for separating and sorting various molecules, for water and air purification, including removal of radioactive contaminants, for harvesting waste heat and solar heat energy, for adsorption refrigeration, as detergents, technology in space ships and computer chips, etc. R R R

Examples of various zeolites in biotechnology and medicine:

- **Analcime**
  - Antioxidant effects in humans R
- **Clinoptilolite** (the most widely used zeolite but a rare form)
  - Antioxidant, antiapoptotic, anti-inflammatory activity R R
  - Antitumor activity R
  - Construction of biosensors R R
  - Detoxification of organisms R R R
  - Drug delivery (diclofenac, doxorubicin) R R
  - gastroprotective effects (stable in the gastrointestinal tract of animals) R R
  - improve feed efficiency, enhance immunity R
  - Positive effects on nutrition and the digestive tract R R R
  - Purification of water, soil, and air R R R R R R R R
  - Removal of radioactive contaminants R
- **Erionite**
  - Highly carcinogenic R
- **Faujasite**
  - Drug delivery (5-fluorouracil) R
  - Studies on endocytosis R
  - Wound healing R R R
- **Ferrierite**
  - Antioxidant R
- **Phillipsite**
  - Antioxidant effects in humans R
- **Zeolite A**
  - Antimicrobial wound-healing dressing R
  - antimicrobial coating of bone implants R
  - inhibition of osteoclasts R
- **Zeolite L**
  - Cell separation R
  - detection of cancer cells R
  - DNA delivery R
- **Zeolite Socony Mobil-5** (ZSM-5), **Silicalite-1**
  - Drug delivery (gentamycin), antibacterial properties, bone implants R R

Natural Zeolite

Natural zeolites are formed when volcanic rocks/ash react with alkaline water and the arrangement of their atoms allows them to act as a "rock-sponge". R

- The sequence of silica-rich volcanic rocks commonly progresses from:
  - Clay → quartz → mordenite–heulandite → epistilbite → stilbite → thomsonite–mesolite–scolecite → chabazite → calcite.
- The sequence of silica-poor volcanic rocks commonly progresses from:
  - Cowlesite → levyne–offretite → analcime → thomsonite–mesolite-scolecite → chabazite → calcite.

As of 2016, the world's annual production of natural zeolite approximates 3 million tonnes, with the highest production coming from China and South Korea. R

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Benefits Of Zeolite

1. Has Anti-Microbial Effects

Zeolite has **antibacterial** properties against:

- ***Clostridium difficile*** R
- ***Escherichia coli*** R R R R
- ***Porphyromonas gingivalis*** R
- ***Pseudomonas aeruginosa*** R
- ***Pseudomonas arsenicoxydans*** R
- ***Salmonella pullorum*** R
- ***Staphylococcus aureus*** (both methicillin-sensitive and methicillin-resistant) R
- ***Streptococcus gordonii*** R

Zeolite as a cream can potentially act as a broad-spectrum antimicrobial for wounds. R

For example, when combined with **chitosan** and **hyaluronic acid**, zeolite may be a useful antimicrobial in vascular grafts. R

Zeolite particles can also combat and reduce **biofilms** from anaerobic pathogens. R R

Zeolite has antifungal properties against ***Candida albicans.*** R

Zeolite has antiviral effects against:

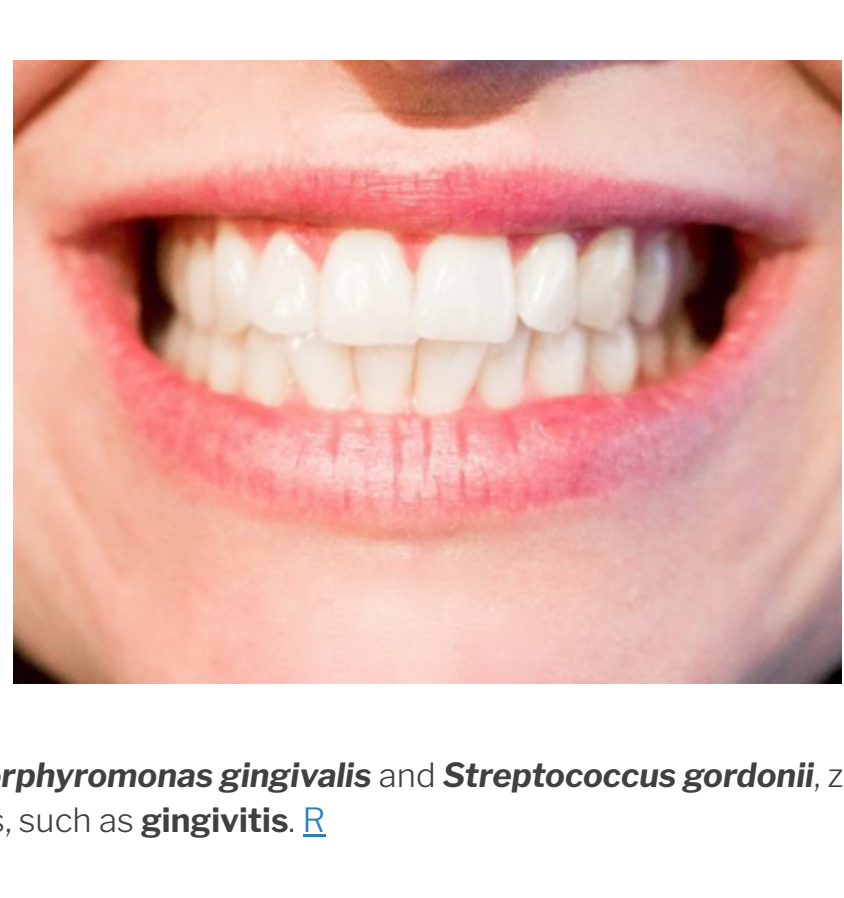
- **Bacteriophage MS2** - can infect E. Coli R R
- **Porcine Circovirus Type 2** (PCV2) R

Zeolite can stop the growth of certain parasites such as ***Entamoeba histolytica*** R

2. May Improve Downstream Effects Of The Serotonergic System

By acting on **5-HT1A** and **5-HT1B** receptors in the brain, zeolite may help improve electrolytes balance and the regulation of the immune system. R

3. Helps Prevent Oral Dysbiosis



By suppressing growth of ***Porphyromonas gingivalis*** and ***Streptococcus gordonii***, zeolite nanoparticles may help prevent periodontal diseases, such as **gingivitis**. R

4. Helps Chelate Heavy Metals

Zeolite can help reduce and chelate **bioaccumulation** of some heavy metals. R

For example, zeolite is able to bind to:

- **Arsenic** R R
- **Cadmium** R
- **Caesium** - may be useful for crop irrigation after radiation accidents R
- **Chromium** R R
- **Cobalt** R
- **Copper** R R
- **Lead** R R R
- **Manganese** R
- **Mercury** (weak) R
- **Molybdenum** R
- **Nickel** R
- **Uranium** R R R
- **Zinc** R

Clinoptilolite zeolites may go well with **Ethylenediaminetetraacetic Acid** (EDTA) for neuroprotection against lead. R

5. Helps Reduce VOCs And Odors

Volatile Organic Compounds (VOCs) are one of the indoor and ambient air pollution causes and boiling water can expose suspended particles to become vapor, which can be harmful indoors. R

Zeolite (as an air purifier or boiling) can improve polluted air by reducing VOCs such as **BTX** (Benzene, Toluene and Xylenes). R R

Zeolite films can also be used to reduce odors. R

For example, **Polycyclic Aromatic Hydrocarbons** (PAHs) are generated from smoking foods and zeolite filters may help reduce PAHs from the food while retaining the flavor. R

6. May Improve Attention

Lead-induced **Attention Deficit Hyperactivity Disorder** (ADHD) may be able to be counteracted by zeolite. R

For example, zeolite nanoparticles can also deliver **DOPA** (precursor to **Dopamine**) into the central nervous system. R

7. May Reduce Alcohol Toxicity

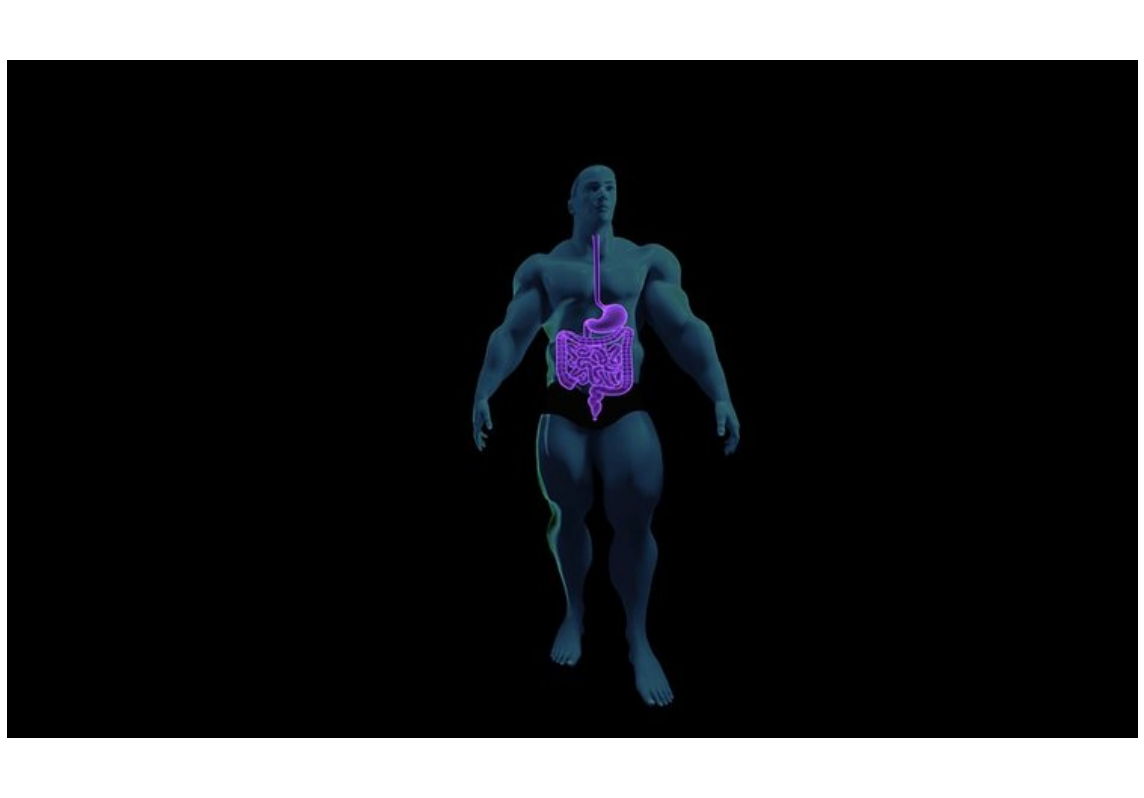
Consumption of **alcohol** with zeolite can decrease absorption of alcohol and its blood level in healthy alcohol drinkers (this effect is more pronounced in males). R

8. Reduces Excess Urea

Zeolaite may also help remove excess **urea** in the blood with those with uremia. R

The efficiency of zeolite's ability to remove urea, **p-cresol**, and **creatinine**, may be more effective than conventional dialysis. R R

9. Improves Gut Function



In the gut, zeolite can improve **intestinal permeability** ("leaky gut"). R

For example in humans, zeolite can improve tight junction function and normalize **Zonulin** (ZO-1) and **Interleukin 10** (IL-10) levels. R

Zeolite can also help with gastrointestinal side effects associated with endurance exercise, such as nausea, stomach and intestinal cramps, vomiting and diarrhea. R

It may protect intestinal function as it can protect against **endotoxin/lipopolysaccharide** (LPS)-induced sepsis and **endotoxemia** (via reduction of TNF-α, IL-1β, IL-2, IL-6, IL-4 and IL-10 as well as **d-lactic acid** and **diamine oxidase** (DAO) during LPS challenge). R

Zeolite has been exclusively studied to relieve **Irritable Bowel Syndrome with Diarrhea** (IBS-D). R

Zeolite supplementation can raise levels of **Lactobacillus acidphillus** in the gut, while decreasing small intestine and cecal pH values. R

Zeolite may also help reduce **ammonia** and nitrite levels (this effect is greater when combined with **charcoal**). R R R R

Zeolite can also help with **Nonsteroidal Anti-Inflammatory Drug** (NSAID) induced gastritis. R

Zeolite has also been reported to reduce symptoms of **Gastroesophageal Refulx Disease** (GERD), such as heartburn, discomfort, and pain, and may act as a replacement for some cases where **Proton Pump Inhibitors** (PPIs) are used. R

When combined with ***Lactobacillus plantarum*** (CIDCA 83114), zeolite may help reduce dietary **mycotoxins** (aflatoxin B1) and by itself it reduces orchratoxin ingestion (with an average reduction of 20 and 80%). R R R

When combined with **Butyrate**, zeolite is able to improve pancreatic digestive enzymes, improve the villi in the intestines, and also increase antioxidant levels inside the gut. R

Zeolite may help with nutrient absorption. R R

For example, feeding chicken zeolite increases omega-3-polyunsatureated fatty acid in the body and in the eggs. R R

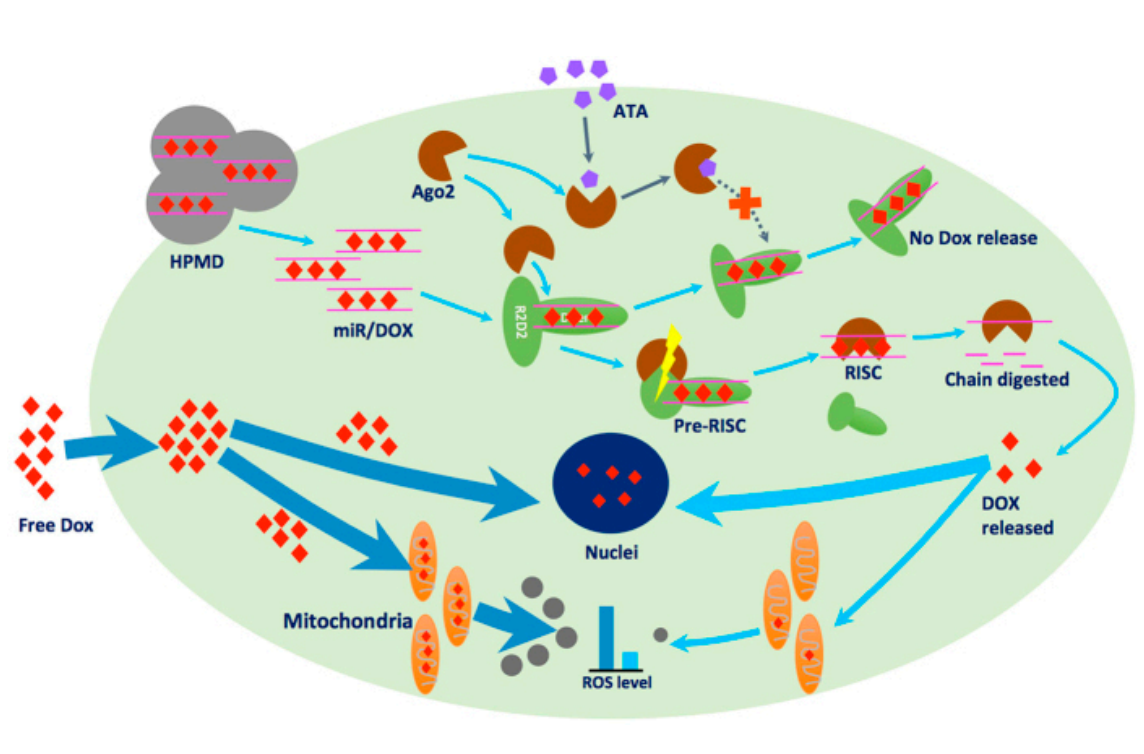
When combined with **Palygorskite** (attapulgite), zeolite can help increase body weight gain, feed intake, nutrient digestibility, as well as increase **Secretory IgA** (SIGA) levels. R

Similar effects can be replicated when zeolite is combined with **zinc**, as animal studies have shown to improve pancreatic activity and sIgA levels, while increasing **Immunoglobulin G** (IgG) levels in the jejunum. R

In animal models, zeolite (chabazite/phillipsite) can improve the microbiome by improving oxidative damage caused by physical stress. R

It can increase levels of ***Lactobacillus*** spp. and ***Enterococcus*** spp. while lowering ***Enterobacteriaceae*** spp. R

10. May Combat Certain Cancers



Zeolite (specifically clinoptilolite) can suppress the growth of certain cancers: R R R

- **Colorectal** R
- **Lung Cancer** R
- **Melanoma** R

Zeolite may also be used as an adjunct with other chemotherapies.

For example, zeolite can enhance the delivery of **Fluorouracil** in colorectal cancer models. R

11. May Improve Glucose And Diabetes

Zeolite can help absorb glucose and may be beneficial for hyperglycemia. R

Zeolite supplementation may help with lipid levels and body weight in those with **Type 1 Diabetes**, although more research is needed in this area. R

When combined with **Black Seed** (Nigella Sativa), zeolite may have beneficial effects on weight gain and antioxidant levels in those with **Type 2 Diabetes**. R

12. May Improve Neurodegenerative Diseases

Zeolite may help with **Alzheimer's Disease** (AD) and similar neurodegenerative diseases. R

For example, dietary zeolite supplementation has been shown to reduce mitochondrial **Reactive Oxygen Species** (ROS), increase **Superoxide Dismutase** (SOD) levels, and attenuate **Amyloid-Beta** (Aβ) accumulation in the hippocampus of mice. R

13. Enhances Wound Healing

Zeolite can significantly improve **wound healing**. R

This is because zeolites can act as oxygen reservoirs, protect against bacterial growth, and can improve cell performance in vascular and skin tissue engineering and wound healing. R R

For example, **CoolClotTM**, significantly reduces the bleeding time in dogs and the clotting time in human blood samples in vitro, and supports the healing of experimental wounds in rats in vivo. R R

Zeolite grafts can also help enhance the treatment of burn wounds. R

Zeolite materials are also potent antimicrobials for wound healing. R

14. Strengthens Bones

Zeolite can be used in bone tissue engineering as zeolites can deliver oxygen to cells, stimulate osteogenic cell differentiation, and can inhibit bone resorption. R

For example, zeolite added into a cell culture medium enhanced **Transforming Growth Factor-β** (TGF-β), DNA synthesis, the activity of **alkaline phosphatase** (ALP) and the production of **osteocalcin** in normal bone cells. R

Another example is with Zeolite A, which can inhibit bone resorption, thus increasing bone density. R

15. Can Be Used For Enhanced Drug Delivery

Zeolites have been used as hosts for small drug compounds (e.g. aspirin, doxorubicin, and paraquat). R R R

QuikClot brand hemostatic agent, which is used to stop severe bleeding, contains a calcium-loaded form of zeolite found in kaolin clay. R R

Zeolite can also be used as a **contrast**-adjunct. R

16. Improves Antioxidant Levels

Zeolite is powerful at raising overall antioxidant levels in the body. R R

Zeolite when taken orally can increase total antioxidant capacity in the liver by increasing **glutathione peroxidase** (GSH-Px), **catalase** (CAT), **total superoxide dismutase** (T-SOD), **total antioxidant capacity** (T-AOC), while reducing **inducible nitric oxide synthase** (iNOS), **total nitric oxide synthase** (TNOS), and **nitric oxide** (NO). R

For example, in Mexican smokers, zeolite was able to counteract oxidative stress as effectively as Vitamin E. R

In clinically healthy men (both non-smokers and smokers), zeolite has shown to increase the blood levels of antioxidant enzymes (increased GSH-Px, SOD and GSH-R, and reduced the lipid peroxidation). R

In the liver liver, zeolite can prevent further damage the of liver after hepatectomy by reducing oxidative stress. R

Also in the liver, zeolites have a protective effect on hepatocytes during anticancer therapy using **Adriamycin** (doxorubicin). R R

17. May Be A Sunscreen Alternative

The antioxidative effect of zeolites can protect the skin from damage caused by UV irradiation and therefore be used for creating **novel sunscreens**. R

18. May Help The Vascular System

Zeolite has beneficial uses for the vascular system. R

Zeolite crystals can be used for the construction of vascular replacements and help with proper oxygen delivery to cells. R R

NO released from Co-ion exchanged zeolite-A can also inhibit platelet aggregation and adhesion of human platelets. R

19. Has Skin Whitening Properties

Zeolites can also be used for skin whitening. R

For example, zeolite 4A inhibited melanin synthesis induced by **alpha-melanocyte-stimulating hormone** (alpha-MSH) in melanoma cells. R

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This is the **zeolite** I'm using.

Other Zeolite Products:

- **Absorbatox** - gastroprotective drug (esp with NSAID use and GERD problems) R
- **Klinobind** - antioxidative agent R
- **QuikClot** - used for bleeding R

Zeolite may go well with:

- **Butyrate** R
- **Charcoal**
- **Chitosan** R
- ***Lactobacillus plantarum*** R
- **Nigella Sativa**
- **Zinc** R

Caveats

Clinoptilolite type of natural zeolite is safe for humans. R

It is used in health industry as adsorbent of free radicals, toxic metals and radioactive elements due to exceptional adsorption, catalyst and ion-exchange properties. R

Some zeolites such as erionite may cause cancer (erioite has similar properties to asbestos, causing lung cancer and malignant mesothelioma). R R R R

Zeolite may release aluminum in the body. R

Inhaling zeolite can be dangerous to the lungs. R

Zeolite clays may cause a delayed allergic response in some. R

Zeolite may also increase renal calcium excretion when first started (which should return to normal after a while). R

Mechanism Of Action

Simple:

- Increases **ALP** R
- Increases **Amylase** R R
- Increases **CAT** R R
- Increases **CIP1** R
- Increases **GSH-px** R R
- Increases **IL-8** R
- Increases **IL-10** (but reduces inflammatory response in LPS challenge) R R
- Increases **IL-17** R
- Increases **KIP1** R
- Increases **Lipase** R R
- Increases **Lipid-Bound Sialic Acid** (LSA) R
- Increases **Maltase** R
- Increases **MDA** R
- Increases **Osteocalcin** R
- Increases **Protease** R
- Increases **p21** R
- Increases **p27** R
- Increases **p65** R
- Increases **SIgA** R
- Increases **SOD** R R R
- Increases **Sucrase** R
- INcreases **TGF-b1** R
- Increases **Trypsin** R
- Increases **WAF1** R
- Increases **5-HT1a** R
- Reduces **A-MSH** R
- Reduces **AP** R
- Reduces **DAO** R
- Reduces **D-Lactate** R
- Reduces **EGF** R
- Reduces **IFN-gamma** R
- Reduces **IL-1b** R
- Reduces **IL-2** R
- Reduces **IL-4** R
- Reduces **IL-6** R R
- Reduces **iNOS** R R
- Reduces **LPO** R
- Reduces **NFkb** R
- Reduces **NO** R R R
- Reduces **PKB/Akt** R R
- Reduces **ROS** R R
- Reduces **TNF-a** R R
- Reduces **ZO-1** R
- Reduces **5-HT1b** R

Advanced:

- IL-8 was released without a clear pattern by any treatment, but its production was considerably higher in MMDM treated with sepiolite NC or talc, compared with clinoptilolite NC. R
- IL-17, which appeared under any treatment at different times, with its production being higher in MMDM and HMDM treated with talc. R
- INFγ was increasingly induced only by talc in MMDM and by sepiolite NC and talc in HMDM, but not by clinoptilolite NC. R
- The combination of butyrate and clinoptilolite enhances size of the villi in the Duodenum, Jejunum, and Ileum, while reduing the crypt depth. R
- Dietary ZA treatment significantly increased ($p<0.05$) the activities of amylase, lipase and trypsin in jejunal digesta and the activities of maltase and sucrase in jejunal mucosa on days 21 and 42. R
- Zeolites can be used for refolding various proteins from their inactive form to their active form, which is important e.g. in preparing recombinant proteins. R R R
- Finely-ground clinoptilolite inhibited protein kinase B (c-Akt), induced the expression of p21WAF1/CIP1 and p27KIP1 tumor suppressor proteins, and blocked the growth in several cancer cell lines. It can therefore be utilized as an adjuvant in anticancer therapy. R

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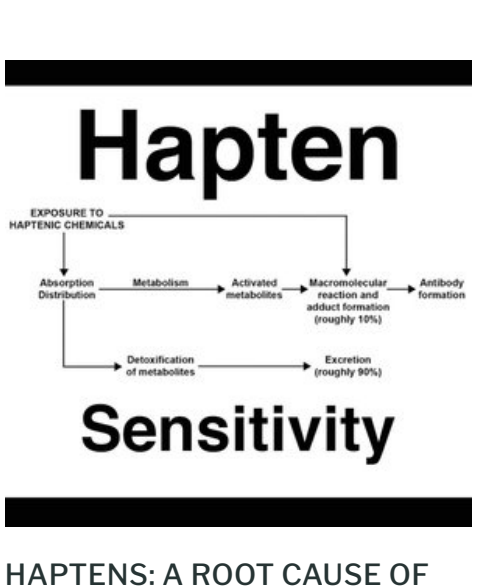

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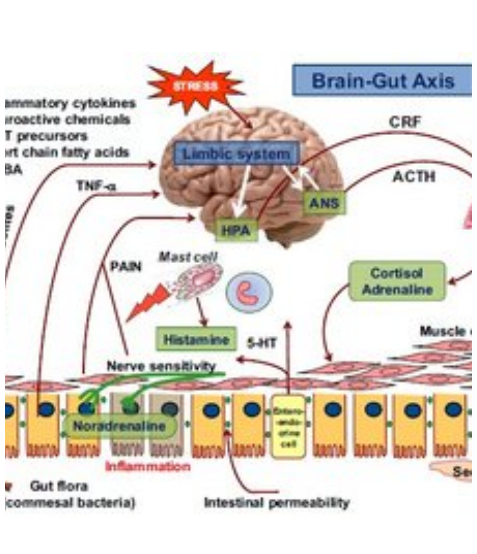

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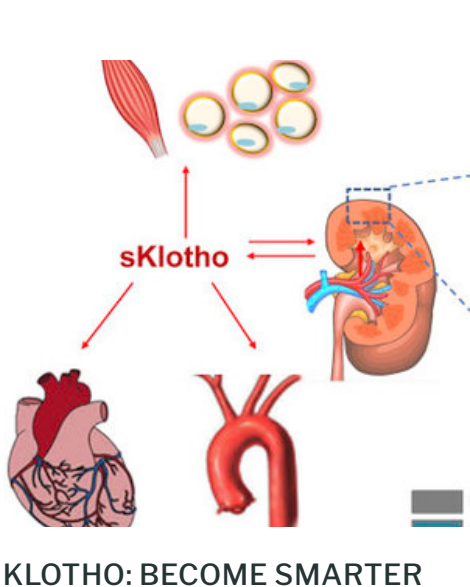

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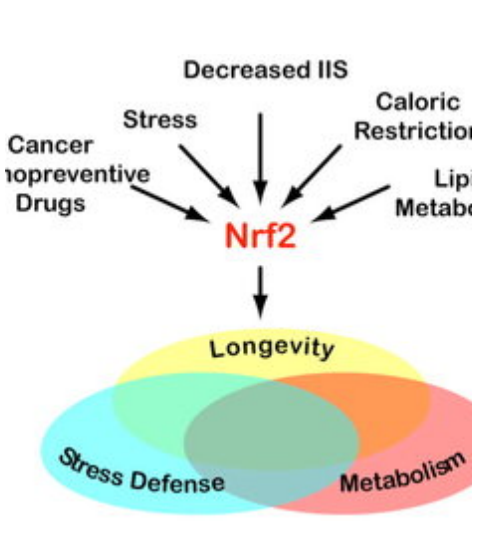

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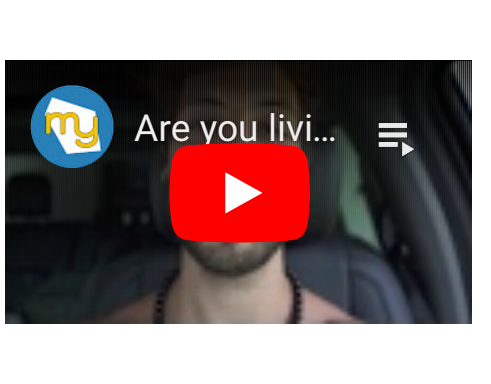

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- Zeolites can also be used in oxygen concentrators to remove nitrogen.
- Zeolites can absorb photons such as with hypericin and methylene blue. R

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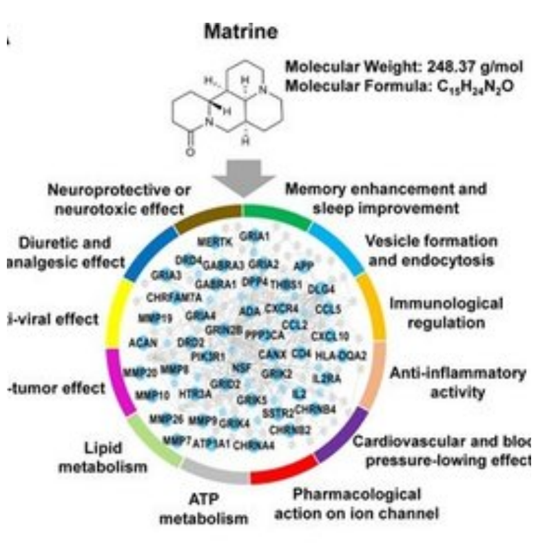
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Sarah S · 3 years ago
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Vivienne · 2 years ago
The German emeritus professor, Karl Hecht M.D. has done tremendous research on Zeolite, most of it in German. He's in his mid 90s now, and has personally taken Zeolite Clinoptilolite for over 25 years and participated in a small longterm study on elders using ZC which found that their silica levels increased rather than crashed (which is the norm in the industrial world). Hecht led the Zeolite treatment of Chernobyl! Several of his students are currently publishing different types of research on ZC.

For those interested in the one translated book of his work in English - it's called "Answers to 100 questions on the Healthy Effect of Natural Zeolite" published by Spurbuch Verlag, 2016. It can be found on the Amazon UK site, and from european booksellers (when there's not a pandemic shutdown on shipping!)
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